

Remarks

The case contains 26 pending claims, of which claims 11-24 are believed to be drawn to a non-elected invention.

Regarding the claim amendments

Claim 1 has been amended to more particularly point out and distinctly claim what applicants regard as their invention. Claim 1 has been amended to include the recitation that the original filament is delivered through a blowing duct. This is supported at page 11 lines 14 et seq. of the specification, and by Figures 5a through 5c and accompanying text.

Claim 1 also has been amended to specify that the original filament is then heated in the range of within 4 mm up and down the axis direction of the filament from the filament center using infrared beams radiated from multiple directions. This is supported by the sentence that bridges pages 6 and 7 of the specification, and further at page 7, first full paragraph.

In addition, clarifying grammatical changes have been made to the last clause of the claim. These changes are not considered to change the scope of the claim.

Claim 9 has been amended per the examiner's suggestion.

Claims 25 and 26 are new, and are supported at page 5 lines 9-11.

As the number of the claims remaining in this case is less than those previously paid for, no fee is believed to be required with this response.

Regarding the title

The title has been amended as suggested by the examiner.

Regarding the objections to claims 9 and 10

Claim 9 has been amended as suggested by the examiner. Claim 10 has been deleted.

Regarding the §112 rejections

Claim 1 has been amended in a way which is believed to resolve the basis for its rejection under §112. Claim 3 has been canceled.

Regarding the Obviousness-Type double-patenting rejections

This rejection is noted. However, the amended claims are considered to be patentably distinct from the claims of USP 7,101,504, inasmuch as the presently amended claims are now limited to a process in which the original filament is delivered through a blowing duct and then heated in the range of within 4 mm up and down the axis direction of the filament from the filament center using infrared beams radiated from multiple

directions. Therefore, the amended claims define subject matter that is patentably distinct from the claims of US 7,101,504.

Regarding the §103(a) rejection of claims 1,2 and 8 over JP 2003-16615 (Suzuki)

The present invention, as defined in claim 1, is a method for manufacturing drawn biodegradable filaments at very high draw ratios (100 or more). Many biodegradable fibers, notably synthetic types such as poly(lactic acid) and poly(glycolic acid), are notoriously difficult to process in commercial spinning operations, especially if they are to be drawn into very fine filaments.

This invention addresses that problem via a low tension drawing process. The process is characterized in that the original filament is heated using infrared beams that are radiated from multiple directions. The fiber is radiated only with a narrow axial distance. In addition, the original filament is delivered to the heating step through a blowing duct.

In combination, these features allow difficult-to-process biodegradable fibers such as poly(lactic acid) or poly(glycolic acid) to be drawn at very high ratios. By delivering the filaments through the blowing duct, frictional forces which might lead to filament breakage are reduced. By heating from multiple directions, fast and uniform heating can be applied while restricting the heating to a small axial section of the filament. This allows the heated section of the filament to be stretched to high draw ratios while minimizing the potential for breakage (by restricting the portion of the filament that is hot at any given time in the process).

Suzuki is concerned with polymers such as nylon, PET and polypropylene which are easily drawn and thus do not need special drawing methods. Suzuki also mentions the possibility that drawing can be performed using a laser and under low tension, but does not describe a way to obtain a draw ratio of 100 or more using such a process. Suzuki also fails to describe the blowing duct and the restricted heating region of applicants' amended claims.

Therefore, the invention as now claimed in claims 2 and 8 is clearly patentable over Suzuki. Claim 2 has been canceled, and the rejection is therefore moot as it applied to that claim.

The examiner's attention is further directed to new claims 25 and 26, which further distinguish over Suzuki by specifying that the biodegradable filament is "synthetic" (claim

25) or is one of several specific types (claim 26). No polymers of this type are described by Suzuki.

Regarding the §103(a) rejection of claim 3 over JP 2003-16615 (Suzuki) in view of Ohkoski et al.

Claim 3 has been canceled, mooting this rejection.

Regarding the §103(a) rejection of claims 4-7 over JP 2003-16615 (Suzuki) in view of US 4,101,525 (Davis et al.)

Claims 4-7 are patentable over this combination of references for the same reasons as claim 1 is patentable over the Suzuki reference by itself. Davis does not disclose the features of claim 1 (and which are therefore present in claim 8) that are missing from the Suzuki reference, and thus does not make up for the deficiencies of the Suzuki reference.

Regarding the §103(a) rejection of claims 4-7 over JP 2003-16615 (Suzuki) in view of US 5,506,041 (Tanaka et al.)

Claim 9 is patentable over this combination of references for the same reasons as claim 1 is patentable over the Suzuki reference by itself. Tanaka does not disclose the features of claim 1 (and which are therefore present in claim 8) that are missing from the Suzuki references, and thus does not make up for the deficiencies of the Suzuki reference.

Respectfully submitted,
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